

Severe Local Anaesthetic Toxicity: Guidelines for management

Subject:	Severe Local Anaesthetic Toxicity
Policy Number	N/A
Ratified By:	Clinical Guidelines Committee
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Version:	4.0
Policy Executive Owner:	Dr N Harper, Clinical Director, Surgery
Designation of Author:	Consultant Anaesthetist
Name of Assurance Committee:	As above
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Target Audience:	Anaesthetists, Operating Department Practitioners, Anaesthetic Nurses, Obstetricians and Midwives
Key Words:	Cardiac arrest, local anaesthetic, bupivacaine, lipid emulsion, Intralipid

Version Control Sheet

Version	Date	Author	Status	Comment
2.0	09/09	T Blackburn	Offline	
3.0	10/10	T Blackburn	Offline	Reviewed with minor update
4.0	10/14	T Blackburn	Live document	Reviewed against current national recommendations. Content remains valid and no amendments are required.

➤ Background

The intravascular injection of local anaesthetic (L.A.) is a rare but recognised complication of regional anaesthesia. It may arise:

- where a needle or catheter is inadvertently inserted into a blood vessel
- where a bolus or infusion of local anaesthetic is administered via an intravenous cannula in error.

Patient consequences include agitation, convulsions, cardiovascular collapse and cardiac arrest. Successful resuscitation (especially after bupivacaine) using conventional therapies can be difficult.

Animal studies demonstrated successful reversion of cardiac output ten minutes after bupivacaine-induced cardiac arrest with the administration of a lipid emulsion (Intralipid)¹. From this data, recommendations were made for its use in humans^{2,3,4,5,6}.

Subsequently there have been multiple case-reports where Intralipid has successfully and safely been used to resuscitate humans from L.A. induced cardiac arrest⁶. AAGBI guidelines recommending its use were published in 2007 and revised in 2010.⁷ The NPSA also recognises its therapeutic potential⁸.

500ml BAGS OF INTRALIPID 20% ARE STORED:

- ***Operating theatre in Labour Ward***
- ***Main theatres recovery***
- ***Day Treatment Centre recovery***
(in all locations adjacent to Dantrolene storage)

➤ Signs of severe toxicity

- Sudden agitation or **loss of consciousness**, with or without tonic-clonic **convulsions**.
- **Cardiovascular collapse**: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur.
- L.A. toxicity may occur up to an hour after injection (or at any time if infused through a catheter).

➤ Immediate Management

- Stop injecting the L.A.
- **Call for help.**
- Maintain the airway and, if necessary, secure with a tracheal tube
- Give 100% oxygen and ensure adequate lung ventilation (hyperventilation may help by increasing pH in the presence of metabolic acidosis).
- Intravenous access.
- Control seizures: e.g. benzodiazepine, thiopental or propofol in small incremental doses.
- Assess cardiovascular status throughout.
- Draw blood for analysis if possible, but do not delay definitive treatment

➤ Management of cardiac arrest

- Start cardiopulmonary resuscitation (CPR) using Advanced Life Support protocols.
- Manage arrhythmias using the same protocols – they may be refractory to treatment (**do not use IV Lidocaine**).
- If the patient is pregnant, relieve aortocaval compression and aim to deliver the baby within 5 minutes
- Prolonged resuscitation may be necessary
- **Treat with Intralipid (see protocol below).**

➤ Remember

- Continue CPR throughout treatment with Intralipid.
- Intralipid can be given to all patients, including pregnant women.
- Recovery from LA-induced cardiac arrest may take >1 h.
- Propofol is **not** a suitable substitute for Intralipid.
- Intralipid has been safely administered to patients with suspected local anaesthetic toxicity **before** the onset of cardiac arrest (e.g. with onset of malignant arrhythmias) – a Consultant Anaesthetist must approve of this management.

➤ Follow-up action

- Warn the lab that Intralipid has been given when sending blood samples – accurate analysis may be difficult and time-consuming.

- Exclude pancreatitis by regular clinical review including daily amylase or lipase assays for two days
- Report cases to the National Patient Safety Agency (www.npsa.nhs.uk) and to the international registry at www.lipidregistry.org.
- Please inform Dr Tim Blackburn with clinical details if Intralipid is administered.

➤ Contacts

- Anaesthetic Registrar (bleep 3005) or Consultant Anaesthetist on call via switchboard.
- Dr Tim Blackburn, Consultant Anaesthetist, via switchboard

➤ References

1. Weinberg G, Ripper G, Feinstein DL, Hoffman W. Lipid emulsion infusion rescues dogs from bupivacaine-induced cardiac toxicity. *Regional Anesthesia and Pain Medicine* 2003; **28**:198-202
2. Weinberg G. Lipid rescue – caveats and recommendations for the “Silver Bullet”. *Regional Anesthesia and Pain Medicine* 2004; **29**: 74
3. Dalglish D, Kathawaroo S. Lipid emulsion to treat bupivacaine toxicity. *Anaesthesia* 2005; **60**: 822
4. Picard J, Meek T. A response to “Lipid emulsion to treat bupivacaine toxicity”. *Anaesthesia* 2005; **60**: 1158
5. Picard J. Lipid Emulsion to treat overdose of local anaesthetic: the gift of the glob. *Anaesthesia* 2006; **61**: 107-109
6. www.lipidrescue.org
7. Guidelines for the Management of Severe Local Anaesthetic Toxicity. Association of Anaesthetists Great Britain and Ireland. 2007 and 2010

➤ **Protocol for Intralipid 20% administration for suspected L.A. induced cardiac arrest**

Approximate doses are given in brackets for a 70kg patient.

IMMEDIATELY	
Give an I.V. bolus of Intralipid 20% 1.5 ml/kg over 1 minute. <i>(Give 100 ml bolus)</i>	AND Start an infusion of Intralipid at 15 ml/kg/hour. <i>(Infuse at 1000 ml/hour)</i>
AFTER 5 MINUTES	
Give two repeat boluses (same dose) at 5 minute intervals if: <ul style="list-style-type: none"> • Cardiovascular stability not restored • An adequate circulation deteriorates A maximum of three boluses can be given.	AND Continue infusion. Double rate to 30 ml/kg/hour <i>(2000 ml/hour)</i> if: <ul style="list-style-type: none"> • Cardiovascular stability not restored • Adequate circulation deteriorates Continue infusion until a stable and adequate circulation is restored or the maximum dose of Intralipid is given.
Do not exceed maximum cumulative dose of Intralipid of 12 ml/kg <i>(840ml)</i>	

